

JC20 Rec'd PCT/PTO 01 JUN 2005 ^[Translation]
RESPONSE

TO: YASUO IMAI, ESQ.

Commissioner, Japanese Patent Office
(MAKOTO YAGI, ESQ., Examiner)

1. DESIGNATION OF INTERNATIONAL APPLICATION: PCT/JP02/12588

2. APPLICANT:

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4. DATE OF OFFICIAL NOTICE: 24 August, 2004

5. CONTENT OF THE RESPONSE

(1) Prehistory

The first Written Opinion officially issued states that the invention as claimed in Claim 1 is lacking in novelty and inventive step, in view of Citation 1 cited in the International Search Report.

ATTACHMENT H

Also, the subject matters of the invention claimed in Claims 2-7 of the application have been deemed to lack inventive step in view of Citations 1-3 cited in the International Search Report.

References cited in the International Search Report:

Citation 1 JP 51-127956 A

Citation 2 JP 49-14857 A

Citation 3 JP 6-323322 A

(2) Contents of the amendment

We would amend the phrase "a fastener ..., which comprises ... a detachable stopper for restraining the torsion coil spring in a state of accumulating a tightening torque" to "a fastener ..., which comprises ... a detachable stopper [fitted to the torsion coil spring, which torsion coil spring releases the tightening torque accumulated thereby when removing the stopper to apply the tightening torque to the fastening member]" On page 2, lines 21-20 of the specification.

The amendment noted above is based on the disclosures "the stopper ... is detachably fitted to the torsion coil spring" (page 3, lines 8-9), "... the stopper detachably fitted to the torsion coil spring ..." (page 3, lines 28-29), and "The torsion coil spring 1 separated from the stopper 1 is released from restriction of tightening torque accumulated by itself, thus to exert the tightening torque to the fastening member B" (page 7, lines 11-13).

Accordingly, the disclosure in the specification relevant to the amendment of the relevant claim is also amended correspondingly.

(3) Characteristic features of the Invention

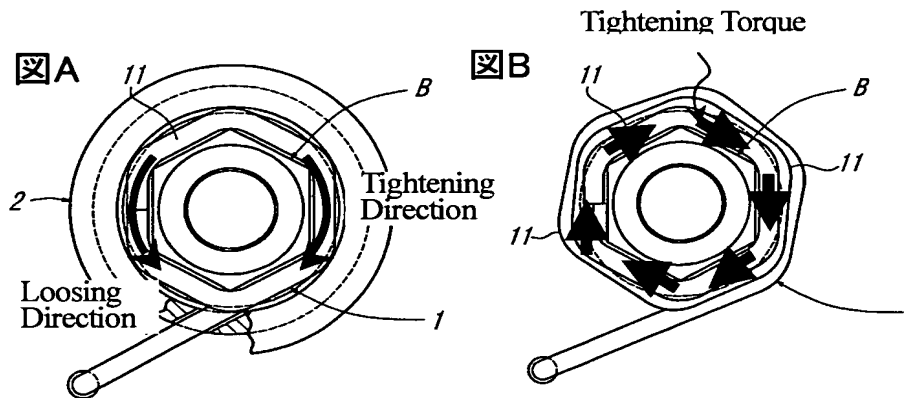
The fastener of the invention claimed in Claim 1 is featured by a torsion coil spring and a stopper for detachably retaining the torsion coil spring in the state of accumulating a tightening torque. Specifically, it is the characteristics of the invention that the tightening torque accumulated by the torsion coil spring is released by removing the stopper, to exert the tightening torque to the fastening member.

To be more specific, the torsion coil spring 1 is restricted to accumulate the tightening torque

when fitting the stopper 2 thereto as shown FIG (A) below, and by removing the stopper 2, the torsion coil spring 1 is released to exert the tightening torque to the nut of the fastening member B in the direction of tightening up the fastening member as shown FIG (B) below. At this time, the torsion coil spring 1 and the nut are in engagement therewith to transmit the tightening torque from the torsion coil spring to the fastening member through their contact surfaces.

Thus, slack of the fastening member such as a nut can be prevented, and besides, the torsion coil spring can "generate a strong torque" (page 3, line 3) exerted to the fastening member in the tightening-up direction.

Furthermore, since the stopper is removed from the torsion coil spring, the ultimate fastening structure is conveniently made small in size.



(4) Comparison between the invention and the cited references

Citation 1 teaches a device having an outer shell member 12 having the shape of fitting to a coil spring from above. The outer shell member 12 is fixedly attached to the coil spring 4 as obvious from the disclosure in Citation 1 such that "the end 6' of the coil spring 4 is secured by a rivet 13" (page 2, lines 4-5 of the upper right column).

However, Citation 1 does not assume that the outer shell member 12 is removed in use, as obvious from the disclosure "the outer shell member 12 is formed in the shape of drawing the end

6' of the spring toward a nut under its own power ... in the state of bringing the engaging piece 15 and the engaging projection 16 in spontaneous engagement therewith" (page 2, lines 13-19 of the upper right column). Thus, the outer shell member is essentially fixed to the coil spring in the undetached state. That is, if the outer shell member 12 is separated in the device of Citation 1, the cited device can not any more function to tighten the nut.

On the contrary, the stopper in the fastener of the present invention is attached to and detached from the torsion coil spring as may be necessary. Therefore, when removing the stopper, the torsion coil spring is released to exert the tightening torque in the direction of tightening the fastening member. This fact elucidates that the fastener of the invention can bring about the desirable effects mentioned above and has an advantage over the prior art including Citation 1.

Accordingly, the fasteners claimed in Claim 1 and dependent Claims 2-7 should be considered as involving an inventive step in the light of the foregoing facts.

Meanwhile, Citation 2 teaches a spring coil formed in a cylindrical cone shape gradually increasing its diameter. However, even if this cylindrical cone-shaped spring coil of Citation 2 is combined with the spring coil 12 of Citation 1, there is formed only a fixed cylindrical cone-shaped spring coil, but the structure as proposed by the present invention can in no way be accomplished.

Citation 3 teaches a fastener having a spring coil formed of a wire restrained by a string-like or frame-like member. However, the spring coil of Citation 3 is a compression coil spring, which is essentially distinct from the torsion coil spring (twisting coil spring). Further, Citation 3 discloses that "elimination of a gap in a screw portion caused by error between a conventional nut and its engaging member brings about a function of effectively preventing slack of a screwing member in the long term by virtue of remaining stress of an elastic main body" (Para. 0024). From this fact, it is obvious that this cited structure has a mere effect of preventing slack of the screwing member, but not a function of tightening a fastening member in the tightening direction as done by the fastener of the present invention.

6. CONCLUSION

Therefore, Applicants strongly believe the patentability of the present invention and respectfully request reconsideration of the application and the passing of this application to issue.